

REMARKS

This reply is in response to Office Action dated November 29, 2007. After entry of this paper, claims 1-6 remain pending in the application. Applicants respectfully traverse the rejections and request reconsideration in view of the following remarks.

Claim Rejections under 35 U.S.C. §103(a)

Claims 1 and 3 and their dependent claims 2 and 4-6 have been rejected under 35 U.S.C. §103(a) as being obvious under U.S. Patent No. 7,155,316 to Sutherland et al. ("Sutherland"). Applicants respectfully traverse the Examiner's assertion.

Independent claims 1 and 3 require construction of a physical safety barrier around a movable robot. In the Office Action, the Examiner seems to equate the mount 35 and the fiducial markers 36 in Sutherland to the physical safety barrier in claims 1 and 3. Sutherland discloses "a mount 35 fixed to the head of the patient and including fiducial markers 36 carried on the mount." *See Col. 15 ll. 56-61 and FIG. 11*. The fiducial markers are small objects which are located at fixed positions around the head of the patient, and which are made from a material that is visible on Magnetic Resonance (MR) images. *Id.* In operation, the patient is placed in the same mount 35 with the same fiducial markers 36 as used in a previous imaging process. *Col. 16, ll. 6-36*. By determining the position of the tool tip relative to the fiducial markers 36, the system can determine and show where the tool tip is on the MR image taken in the previous imaging process. *Id.*

Claims 1 and 3 require a physical safety barrier constructed around a robot, and as a result, the robot arms are always within the physical safety barrier. On the

contrary, as seen in FIG. 11 of Sutherland, the mount 35 and the fiducial markers 36 are placed around the head of the patient while the robot arms 102 and 103 are located outside the mount 35 and the fiducial markers 36. The mount 35 and the fiducial markers 36 are not constructed around the robot as required in the claims.

In the present invention, a physical safety barrier is constructed around a robot and a virtual safety barrier is set inside the physical safety barrier, and a working region ("margin region") can be formed between the virtual safety barrier and the physical safety barrier. The movable portions of the robot are controlled within the virtual safety barrier so that the workers can safely operate in the formed margin region. Sutherland is directed to microsurgical robot system used in surgical procedures. Outside of the virtual "no-go" boundaries would be human tissue. All the operations would be performed within the virtual "no-go" boundaries. There is no need in Sutherland to construct a physical safety barrier outside of the virtual "no-go" boundaries.

In addition, the mount 35 and the fiducial markers 36 are used to assist positioning the tool tip over the MR images. The mount 35 and the fiducial markers 36 do not "construct a physical safety barrier around a movable robot," "define in memory a virtual safety barrier set inside the physical safety barrier," or "carry out a control to start the braking of the robot arm at a predetermined distance ahead of the virtual safety barrier" as required in claims 1 and 3. The fact that, in operation, the tool tip may work within the patient's head which the mount 35 and the markers 36 are fixed on, does not mean that the mount 35 and the markers 36 form a "physical safety barrier." Sutherland does not teach or suggest that the mount 35 and the fiducial markers 36 form any boundary around any tools.

Accordingly, Sutherland fails to teach "constructing a physical safety barrier around a movable robot" as required in claims 1 and 3. Therefore, independent claims 1 and 3 are allowable over Sutherland.

Claims 2 and 4-6 are ultimately dependent upon claim 1 or claim 3; and thus, claims 2 and 4-6 are patentable for at least the same reasons as set forth above in connection with independent claims 1 and 3.

CONCLUSION

In view of the foregoing amendments and remarks, Applicants respectfully request reconsideration and reexamination of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to Deposit Account No. 06-0916.

Respectfully submitted,

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